Foldable Transportable Multiple Function Pilates Exercise Method and Apparatus

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FIELD OF THE INVENTION

This invention relates generally to the field of Pilates exercise equipment and more particularly to a machine which combines three Pilates exercise systems- reformer, pole, and chair in one footprint, and which may be folded into an upright position for storage and rolled for relocation.

BACKGROUND

The prior art includes numerous designs of Pilates type exercise equipment, beginning with the original U.S. Patent No. 1,621,477 issued to Pilates for a wheeled platform carriage connected to a resistance device.

A reformer exercise apparatus typically includes a wheeled platform carriage which rides on parallel rails or tracks on a rectangular wooden or metal frame. Most devices employ a series of parallel springs or elastic members which connect the carriage to the foot end of the frame. The springs are manually interchangeable in order to provide a variable resistance.

The carriage typically includes stationary shoulder pads and a head rest. It is desirable to be able to convert the carriage with its raised shoulder pads and a head rest into a flat surface.

A foot bar is located at the foot end of the device so that the user can press one or both feet against the foot bar and push the carriage against the spring resistance.

Adjusting the position of the carriage in relation to the foot bar is important to accommodate different body types, and is typically accomplished by manually moving a spring bar into different gear settings at the foot end of the reformer or by adjusting the foot bar position. It is desirable to provide a simple mechanism which allows for gear adjustment without requiring the user to interrupt the flow of exercise to make the necessary adjustment.

Pulleys mounted on pulley risers on support posts are often located at the head end of the reformer frame. The pulleys, themselves, are often adjustable in height during exercises where the user pulls the carriage by means of a rope or strap threaded through the pulley. The prior art pulley systems include swivel pulleys capable of accommodating ropes but not straps. Although a significant contingent of classical trained Pilates practitioners prefer the usage of flat straps, rather than ropes, the equipment typically provides only stationary, non-swivel casters or rollers when using flat straps. It is desirable to provide a fully articulating swivel pulley for straps as well as for ropes, thereby enabling the user to pull the carriage through its entire path without the binding and dragging of straps which typically occurs between the pulley and its bracket in the stationary design. It is also desirable to provide a swivel pulley which can be accommodated by a pulley riser system, and thereby allow the user to adjust the height position, as is currently available with rope systems.

Reformers are usually over 7 feet in length, and commercial models exist either as stationary units, or stackable units. The stationary units are difficult, impractical or time-consuming to move. Wheels have been added to the legs of such stationary units, but are of limited value, as they are bulky and ungainly to move, while the large amount of space

required for the footprint of the unit remains the same. Stackable units typically require at least two persons to break down and stack in another location, or on a rolling cart, which then is wheeled to another location. It is, therefore, desirable to provide a device that can be folded into a minimal, space-saving footprint, which can be transported, if desired, by one individual.

It is desirable from the standpoint of economy of cost and space to provide a integrated Pilates machine which combines three Pilates machines- reformer, pole system and chair in one footprint, thus enabling the user to perform in this one machine most of the exercises in the full Pilates repertoire. In the current invention, the user can with no or very little compromise, and with ease of transition, perform exercises in the reformer mode, the pole system mode, and in a mat flat padded platform mode; and can perform a substantial number of chair exercises.

The prior art includes referenced to hinged or foldable frames. U.S. Patent No. 3,770,267 issued to McCarthy describes an exercise machine without legs, which has a foldable frame. U.S. Patent No. 4,706,953 issued to Graham describes an exercise machine which is collapsible by folding and by telescopic joints to make it more compact for transport and storage. U.S. Patent No. 6,186,929 B1 issued to Endelman et al. describes a reformer apparatus with a two-part rail with a tongue connector. That patent includes a brief reference to an alternate embodiment where the tongues may include a hinged portion which permits the rail sections to be pulled apart and folded for transport.

The prior art includes references to wheels on the platform. U.S. Patent No. 2,733,922 issued to Diego describes an exercise platform with four retractable wheels.

The '929 patent describes a foldable reformer with no legs and two fixed wheels at the foot of the device.

Several prior art patents describe headrests on the carriage including the '922 patent, and U.S. Patent No. 4,884,802 issued to Graham. U.S. Patent No. 5,338,278 issued to Endelman describes a 4-position headrest. U.S. Patent No. 5,681,249 issued to Endelman describes a removable headrest.

The prior art includes various footbar support designs. U.S. Patent No. 1,738,987 issued to Dattilo describes a footbar with a pivot. The '922 patent and U.S. Patent No. 5,066,005 issued to Luecke describe slots to adjust the footbar. The '278 patent describes a 2-way adjustment with a kick plate. U.S. Patent No. 5,364,327 issued to Graham describes a kick plate which is adjustable along the track. U.S. Patent No. 5,607,381 issued to Endelman describes a 2 position reversible bar on a metal frame. U.S. Patent No. 5,653,670 issued to Endelman describes an adjustable bar and plate. The '249 patent describes a footbar which pivots for storage.

The prior art includes various designs of spring bar adjustment mechanism including the '249 patent which describes a rod and bracket, the '267 patent which describes a spring adjustment; the '987 patent; and U.S. Patent No. 5,792,033 issued to Merrithew. U.S. Patent No. 6,120,425 issued to Endelman describes a combination of anchor bar and carriage stop.

The prior art includes various designs of risers and pulleys including the '005 patent, the '278 patent, and the '922 patent which describes handbars. U.S. Patent No. 3,586,322 issued to Kverneland describes an auxiliary frame. The '929 patent describes removable, non-adjustable risers.

The '249 patent describes panels on either side of carriage so that the carriage may be converted to a flat bench.

The present invention provides an attractive, durable, versatile, space-saving, and cost-saving commercial Pilates machine, which may be easily folded in to a minimal footprint and transported and stored out of the way.

SUMMARY OF THE INVENTION

The current invention features an improved Pilates machine. One embodiment of the invention includes an integrated piece of equipment which combines three Pilates machines- reformer, pole system and chair in one footprint, thus enabling the user to perform in this one machine up to 90% of the exercises of Pilates repertoire. The user can, with virtually no compromise, and with ease of transition, perform exercises in the reformer mode, the pole system mode, and a mat flat padded platform mode; and can perform a substantial number of chair exercises. One embodiment of the invention includes integrated components that, when set up, form a chair comprised of a chair pedal hinged to the wheeled base, multiple position spring attachments, and specially designed long/short box that doubles as a chair seat.

One embodiment of the invention includes the hinging of a professional-grade, heavy duty frame, so that the machine may be folded into an upright position; and a wheeled base, so that the folded upright machine may be wheeled to various locations for storage.

One embodiment of the invention includes a head rest and shoulder pad component which may be reversed by being flipped into a downward position, enabling

the placement of a conversion mat on the frame to mate with the carriage pad in order to convert the reformer into flat platform mat.

One embodiment of the invention includes a gear changing mechanism located on the underside of the carriage, enabling the user to easily change the gear positions of the reformer with a simple single motion, without requiring the user to interrupt the flow of exercise by getting off the reformer to make the necessary adjustment.

One embodiment of the invention includes a fully articulating swivel pulley for both ropes and flat straps, thereby enabling the user to pull the carriage through its entire path without the binding and dragging which typically occurs with flat straps, between the pulley and its bracket in the stationary design.

One embodiment of the invention includes a mechanism which may be easily rotated in three positions to serve as an adjustable mechanism to which either the rope or strap pulleys are attached for use when in the reformer mode, as a support mechanism for the attachment of the chair springs when in the chair mode, and for out of the way storage when utilized in the pole system mode with the conversion mat in place.

BRIEF DESCRIPTION OF THE DRAWINGS

The Invention may be more easily understood, and its benefits would become more apparent, with the viewing of the following figures:

Fig. 1 is a perspective view from the front of an extended reformer in a normal position.

Fig. 2 is a perspective view from the rear of an extended reformer in a normal position.

Fig. 3A is perspective view of the underside of the carriage assembly.

Fig. 3B is a detailed front cross sectional view of the carriage rope/strap channel.

Fig. 4 is a front perspective view of a folded reformer.

Fig. 5 is a rear perspective view of a folded reformer.

Fig. 6 is a front perspective view of a reformer with pole extensions.

Fig. 7A is a rear perspective view of a chair on the reformer.

Fig. 7B is a rear cross sectional view showing the chair attachment bracket.

Fig. 8 is a detailed perspective view of the footbar and its adjustment bracket.

Fig. 9 is a side cross sectional view of the carriage showing the gear bar and spring adjustment mechanism.

Fig. 10 is a side view of a tilted folded reformer.

Fig. 11 is a cross sectional view of a rail member.

Fig. 12 is an exploded diagram of a pulley and support.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to Fig 1, which is a perspective view from the front of an extended reformer in a normal position and to Fig. 2, which is a perspective view from the rear of the extended reformer, the reformer includes a sliding carriage **300,** with a head rest and shoulder stop assembly **315.** The head rest and shoulder stop assembly includes a head rest **310** and shoulder pads **320**. The platform slides along a right rail comprised of two sections, a rear section **200** and a front section **201**; and a left rail comprised of two sections a rear rail section **202** and a front section **203**. In one group of exercises, the user lies or sits on the carriage and pushes one or both feet against a foot bar **480** which may be positioned into various angles with an adjustable support bar **484** and a mounting

bracket not shown. The rails are supported by a foot base **180** and a head base **100**. The head base includes wheels **104** and head base poles **120**.

In another set of exercises, the user typically pulls the platform by means of a rope, cable or strap through pulleys **154** which are each mounted on a rotatable risers **140.** The user pulls the straps through the pulleys lying supine or prone, standing, or sitting on the carriage, facing back, front, or sideways, depending on the exercise. The pulley height may be adjusted as discussed below.

In another set of exercises, a chair is formed by positioning a box partially over rail sections **201** and **202.**

The reformer may be folded into an upright position by lifting up on the lift handle **250**, which also acts as a stabilizing bar between rail sections **200** and **203**. The lift handle is raised until the base **180** is pulled over the inclined face **102** of the head base **100**. The folding of the rails is assisted by head rail hinges **260** which permit rail sections **201** and **203** to rotate with respect to the head base poles **120**.

The headrest can adjust to lie flat or incline with respect to the carriage surface. The headrest and shoulder pads are constructed as an integrated assembly and is hinged to the carriage platform so that it may be rotated 180° to face downward so that a conversion mat can be inserted to convert the reformer into a flat bed. The hinged headrest and shoulder pad assembly is double locked, and can be released by pulling a disengagement cable or rod located below the headrest. After disengaging the lock, the assembly can be rotated 180 degrees downward, and a mat may be placed over the rails and the assembly area in order, so that the carriage mat and the mat provide a continuous flat surface for performing mat exercises. This assembly is an improvement over prior art

where shoulder rests are typically pinned to the carriage, and must be removed to provide a flat surface.

Referring now to Fig. 3A, is perspective view of the underside of the carriage assembly and the underside spring mounting mechanism, the carriage rides on four carriage wheels **340**, which are preferably in-line skate wheels which travel in a channel in the reformer rails. The wheel axles **341** are supported by roller brackets **342** attached to the carriage subframe **420**.

The carriage resistance is provided by a plurarity of interchangeable springs **402**, usually three or more springs. Each spring has a spring handle **403** which has a spring retaining ball **404** which may be extended and slipped into a spring handles slot **405** (not shown) on a spring retention plate **408** (not shown) on the reformer frame near the footbar in order to set one end of the spring. The second end of each spring **407** is secured in its respective retention slot **406** on a spring gear bar **410** so that the springs are parallel to the reformer rails. A gear changer **401** (not shown) may be pulled out from the base of the carriage thereby disengaging a spring gear bar **410** so that the user may slide the carriage while remaining on the carriage.

In this embodiment, the carriage is positioned in one of 5 positions determined by the position of the spring gear bar into appropriate slots **416a-416e** of spring gear bar adjustment plates **415** which are positioned on both sides of the carriage.

The slots of this embodiment include **416c,** a one position; **416d,** a two position; and **416e,** a three position. These three positions 416c, 416d, and 416e are typical of Pilates exercise equipment. In addition to these positions, the current invention includes a novel zero position, **416a,** which is used only in the storage and movement of the

apparatus; and a minus one position, **416b,** which is not found in prior art. In this embodiment, the **416b** position places the carriage closer to the foot base, such that the distance from **416b** to **416c** is the same as the distance from **416c** to **416d.** This setting is typically used by persons five feet or less in height.

The distance from the carriage platform to the spring attachment box at the foot of the frame is controlled by the location of the spring gear bar on the spring gear bar adjustment plates. The spring bar typically has multiple, interchangeable tension springs attached to it. The user attaches the free end of the spring to the spring retention plate in the spring attachment box at the foot of the reformer. At least one of the four springs attached to the spring bar must be engaged when changing gears. The user changes gears while lying or sitting on the carriage by pulling on a stiff wire loop, ball, or hand grip gear changer which pulls a cable or rod is proximity to the spring bar. Pulling on the gear changer causes the cable or rod to disengage the spring bar from its slot and moves the spring bar into a neutral position that allows the user to move the carriage forward or back, thereby engaging the spring bar in another position on the ratchet plate when the gear changer is released.

The carriage position corresponding to the spring bar position is marked on the side of the frame. Taller users generally use a position where the carriage platform is further away from the spring attachment box; shorter users generally use a position where the carriage platform is closer to the spring attachment box. There is also a "parked" position **416a**, in which the carriage platform is adjacent to the spring attachment box. This is the position the carriage platform should be in before folding the reformer.

Fig. 3A also shows the rope or strap retaining bracket **330**. In some exercises, the user pulls the carriage toward the head of the reformer with straps or ropes that are wrapped around pulleys secured to risers on the head base poles at the head of the reformer. One end of these ropes or straps typically includes a hand grip, and the other end is positioned in the retaining brackets **330** after wrapping the strap or rope around the pulleys.

Referring now to Fig 3B which is a detail of the strap retainers **332** which are secured in the retaining bracket **330**, the strap **336** has regularly spaced holes, and one of the holes may be selected to fit over a strap retaining pin **331.** The strap position is changed by lifting the headrest assembly and selecting another length. When the headrest is lowered back into position, the headrest presses against the strap and holds it in position over the retaining pin.

Referring now to Fig 3C which is a detail of the rope cleats **335** which are secured in the retaining bracket **330**, the desired rope length is selected, and the rope **337** is pressed into the cleat, which may be a sailboat cleat. The rope position is changed by lifting the headrest assembly, pulling the rope upwards out of the cleat, readjusting the length, pressing the rope into the cleat, and lowering the headrest back into position. The headrest presses against the strap and a rope retainer **334** holds the rope in position in the cleat.

Referring now to Fig. 9, which is a side cross sectional view of the carriage showing the gear bar and spring adjustment mechanism. the spring gear bar **410** is held in a slot on the spring gear bar adjustment plates **415** by a retaining spring **431.** The spring gear bar may be disengaged from the slot by a disengagement member **430**. In one

embodiment, that disengagement member is a cable with a loop **401**, or other handle, which may be pulled by the user from the rear of the carriage. Alternately, the cable may be replaced with a solid rod or other apparatus which causes the gear spring bar to the released from its retention slot.

Referring now to Fig. 4, which is a front perspective view of the folded reformer and to Fig. 5 which is a rear perspective view of the folded reformer, each reformer rail may be folded along a middle hinge **240** located between the frame rail sections on each rail so as the rails are folded, foot base rollers **182** on the base support roll up the front incline surface of the head base until the unit is snapped into a closed position with the rail sections resting in base rail supports **170**. One or more gas cylinders **270** provides lifting assistance. The unit can then be tilted backwards slightly and rolled with head base wheels **104** in order to cart the equipment to storage or another location. The rotatable risers **140** have been rotated 90° on the head base poles **120** in order to provide room for the rear rail sections to fold upward. In this embodiment the wheels are preferably roller blade or inline roller wheels. Finger guards **241** cover the hinges **240** as the unit is raised and lowered.

Referring now to Fig. 10, which is a side view of a tilted folded reformer, the unit has been tilted back on its base wheels **104** so that it can be moved. The shoulder pads **320** provide convenient handles for moving the folded reformer.

Referring now to Fig. 11 which is a cross sectional view of a rail member, the frame sections **200**, **201**, **202**, and **203** are preferably extruded aluminum. The exterior of the frame section includes a rail insert **210** for insertion of decorative wood or plastic trim. The carriage is supported by rollers which travel in a rail track section **205** on

concave rail **220**. The concave rail it typically in a "V" or "U" shaped cross section. The rail cross section includes a horizontal blade surface **224** and a vertical blade alignment surface **225** that permit horizontal vertical alignment blades **243** (not shown) and vertical alignment blades **245** (not shown) to butt those surfaces for alignment as the rails are unfolded and for reinforcement of the rail section hinged joints when the rails are it is extended into its non-folded position. The hinge provides additional alignment and support. In this embodiment the rail section includes a top cavity **221** and bottom cavity **222** which permit other elements to be bolted or screwed to the rail sections without interfering with the roller travel. The rails track section side walls may include nylon side glide strips to ensure smooth, precise tracking of the carriage in the reformer frame.

Referring now to Fig. 8, which is a detailed perspective view of the footbar and its adjustment bracket, the foot bar **480** pivots on a foot bar pivot **481** and may be positioned at various angles by moving the foot bar support **484** into one of a variety of positions with the foot bar support bracket **486**. A standing platform **450** is attached by hinges 451 to the reformer frame, so that it may by raised to provide access to the footbar support bracket **486**. The standing platform may alternatively be hinged at the spring retention plate so that it opens from the rear. The folding lock **490** engages a pin on the front rail section when the unit is folded in an upright position, thereby locking the unit in a folded position.

Referring now to Fig. 6, which is a front perspective view of a reformer with pole extensions, additional Pilates exercises can be performed with the pole extensions **122** and the push through bar **125**. The pole extensions may be secured to the base pole with head base pole bushings **121** which fit inside the ends of both the base poles and the

extensions, and have spring pins to engage holes in the base poles and extensions. This view also shows the chair box bracket **650** and the chair **640** which are used with chair exercises as described below. This view also shows the headrest assembly in a partially folded-down position.

Referring now to Fig. 7A, which is a rear perspective view of a chair on the reformer to permit Pilates chair exercises, the chair box **600** attaches to the poles on both sides of the slide rails. The chair box, which is typically a Pilates long/short box, is placed on the carriage platform of the front rail sections. The chair box slips into a chair box bracket. Chair springs **610** are connected to the chair springs attachment plate **640** (not shown) and to the chair pedal **620** which is hinged to the head base. The position of the chair springs may be varied into a number of slots on the chair springs attachment plate **640** (not shown). The chair exercises can be preformed on the extended reformer in the chair mode or the long/short box can be easily removed to permit other exercises to be performed in that space. The chair pedal attaches to the base of the frame. Springs attach from the pedal to the chair spring attachment plate **640**. The user performs exercises sitting on the chair, standing in front of it, or to either side of it. In the reformer mode, the chair box is removed and the springs are removed from the chair spring attachment plate and are secured for storage on the chair pedal.

Fig. 7B is a rear cross sectional view showing the chair box **600** secured in the chair box bracket **650**. This use of the long/short box is in addition to the use of the box in the reformer mode. In the reformer mode, the box may be placed either lengthwise or crosswise on the carriage to conduct reformer exercises. In the current invention, this long/short box has been modified by removing a portion of its front and back walls to

provide a path for the chair springs. This modification to the long/short box, and the use of the chair box bracket permit the long/short box to be used for both its reformer functions, and for some chair exercises.

Referring now to Fig. 12 is an exploded diagram of a pulley and support, the pulley adjustment mechanism includes an adjustment slot **144** (not shown) on the pulley riser **140** (not shown) such that a pulley adjustment knob **150** may be slid up or down in the slot to change the height of the pulley and then tightened appropriately. The pulley adjustment knob has a threaded stud **151** which travels in the slot. In this embodiment, the threaded stud is connected to a 1/8 inch flexible cable **160**, a pivot bushing 161 and a cable stop **162**, which together act as an articulation means to permit the pulley bracket **152** to move in all directions. The articulation means permits straps to be used at various working angles without binding between the pulley roller and the pulley bracket. Other articulation means such as chain sections or eye bolts may also be used. An interchangeable pulley roller **154** may be inserted into the pulley bracket, such as a flat roller for straps or a v-type of pulley for a cord rope or cable. In this embodiment, the pulley roller is held in the pulley bracket on an axle bolt **156** and a nut **157**.

Variations of the present invention will be apparent to those skilled in the art, and many of the elements described are equally suited for substitute elements. For instance, the resistance mechanism may be spring or elastic chords; the number and type of carriage support wheels may be varied; the track strap can vary; the number and type of rollers on the head base and foot base may vary; ropes, cables, and straps may be used to pull the carriage; various pulley shapes and types of hinges may be used. These and other changes familiar to those skilled in the art are anticipated in by this invention.